

Instruction Manual

SUNJE

SXC-10BT(DC)

(Eng)

It is recommended that only persons who have sufficient knowledge and experience such as system designers and responsible persons deal with this product after carefully reading the product manual.

1 The matters of safety

WARNING

- * Do not fabricate or do maintenance by yourself. Malfunction, Electric shock, and fire danger are considered. Contact us directly if you need the item to be repaired.
- * Do not let the water touch the product. It may cause electric shock or fire due to malfunction.
- * When you check or maintain the product, make it sure you turn off the power.
- * It may cause electric shock or fire due to malfunction.
- * The item should be fixed to the target tightly. Electric discharging or breakage might happen.
- * This device is made only for industrial uses. You need to ground the device beforehand. Otherwise, there are in case of malfunction, electric shock, or fire damage.

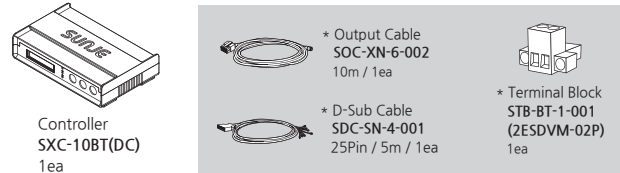
CAUTION

- * Do not disconnect the output cable with power applied. There is a possibility of electric shock or malfunction.
- * Connect wires referring to the product manual. Wrong connection can cause failures.
- * For your proper cable connection, take a look at the manual "Installation & Connection," for references. Any disordered connection is detected, the malfunction might arise.
- * All cables should be connected all the time. Please careful of cable disconnections. If power or communication cables got damaged, replace them immediately. Malfunction and fire danger may happen.
- * Do not install the device where the vibration can be detected. Any minor impact or vibration on the device, the malfunction or danger of accident might happen.
- * Do not use the item off the range of usage(Electrostatic elimination). Malfunction or danger of accident may occur.

2 Check the package contents

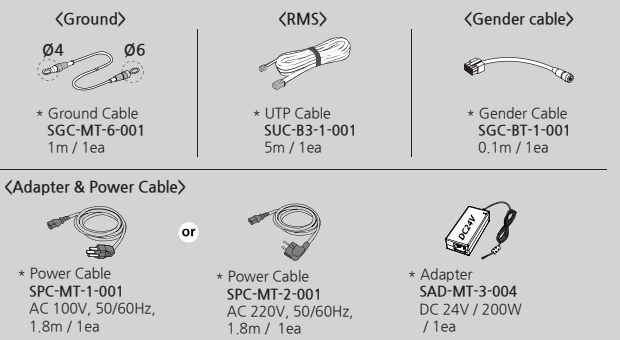
Product compositions

The package includes the following products composition.

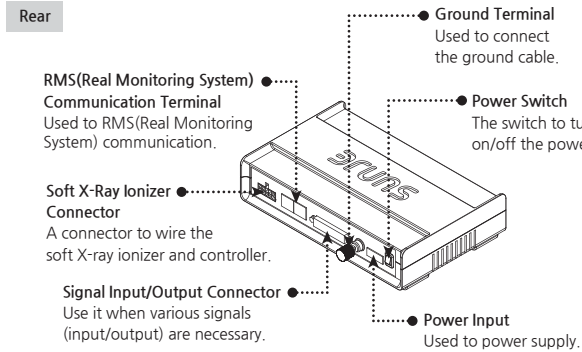
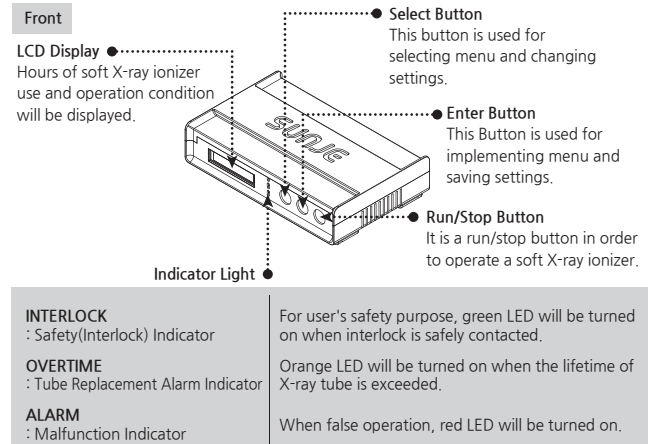


Option

If you require extra functions with the basic accessories we provided, you need to purchase optional items in below for further assistant.



3 Nomenclatures of parts



4 Installation and connection

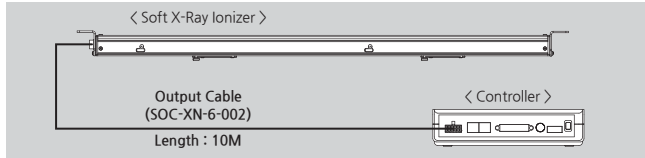
Soft X-ray ionizer connectable with SXC-10BT(DC)

SXB-05N	SXB-05NS	SXB-05SP1R	SXB-05SP2L
SXB-05NR	SXB-05NSR	SXB-05SP1RL	SXB-05ND
SXB-05NRL	SXB-05NSRL	SXB-05SP2	SXB-05W

How to connect

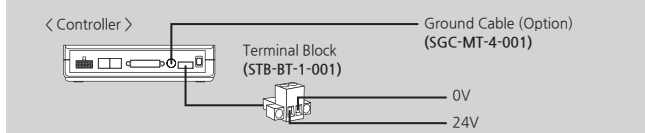
Connecting the soft X-ray ionizer

Please connect the soft X-ray ionizer and controller with supported "Output Cable".



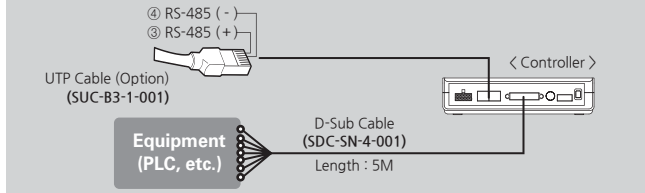
Connecting the Ground and Power

Connect the power supply (DC24V) using the provided terminal block. (SMPS or Optional adapter)



Connecting the Input & Output Signal Cable and Communication Cable

Please connect the controller and external machinery equipment with supported "D-Sub Cable".



Input/Output Signal Cable Specifications (D-Sub Cable)

Division	No.	Pin Name	Labeling	Color	Function
INPUT	1	REMOTE ON	RMT-ON	Black	Remote On/Off (Electrical Contact)
	2	REMOTE OFF	RMT-OFF	White on Black	
	3	COMMON	RMT-COM	Brown	Interlock On/Off (Electrical Contact)
	4	INTERLOCK INT-ON	INT-ON	White on Brown	
	5	INTERLOCK INT-OFF	INT-OFF	Red	
OUTPUT	6	REMOTE(N.O)	RE-N.O	White on Red	Remote On/Off State Output
	7	REMOTE(COM)	RE-COM	Orange	
	8	REMOTE(N.C)	RE-N.C	Black on Orange	Interlock On/Off State Output
	9	INTERLOCK(N.O)	IN-N.O	Yellow	
	10	INTERLOCK(COM)	IN-COM	Black on Yellow	
	11	INTERLOCK(N.C)	IN-N.C	Green	-
	12	NOT USED	-	-	
	13	GROUND	-	Black	
	14	POWER(N.O)	POW-N.O	White on Green	Power On/Off State Output
	15	POWER(COM)	POW-COM	Blue	
	16	POWER(N.C)	POW-N.C	White on Blue	Over Time State Output
	17	Over Time(N.O)	HEAD-N.O	Violet	
	18	Over Time(COM)	HEAD-COM	White on Violet	
	19	Over Time(N.C)	HEAD-N.C	Gray	Alarm(Abnormal) State Output
	20	ALARM(N.O)	AL-N.O	Black on Gray	
	21	ALARM(COM)	AL-COM	White	
RS 485	22	ALARM(N.C)	AL-N.C	Black on White	-
	23	NOT USED	-	-	
	24	RS-485(+)	RS-485+	Pink	RS 485 Communication
	25	RS-485(-)	RS-485-	Sky Blue	

5 How to set

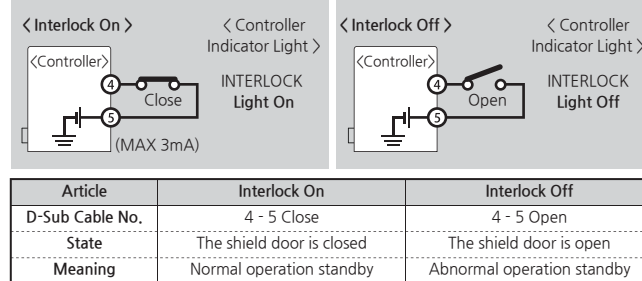
Set the interlock

Interlock On

If #4 and #5 of a D-Sub cable are connected, the interlock is on. When LED is on, it shows that the door is securely locked and totally shielded.
"Interlock indicator (INTERLOCK)" light will be turned on in the front of the controller.

Interlock Off

If #4 and #5 of a D-Sub cable are disconnected, the interlock is off. When LED is on, it shows that the door is securely unlocked and not shielded well.
"Interlock indicator (INTERLOCK)" light will be turned off in the front of the controller.



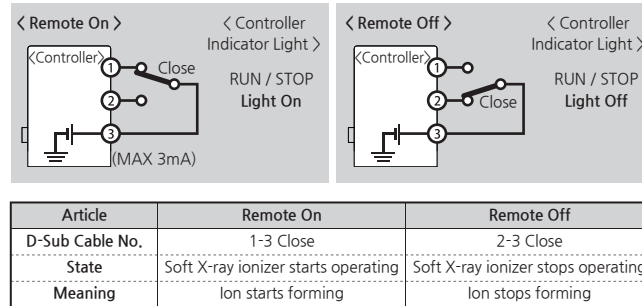
Set the remote

Remote On

Under interlock ON condition, Remote is set. Remote ON means that ion generates as Soft X-ray ionizer is working. If #1 and #3 of a D-Sub cable are connected, the remote is on.

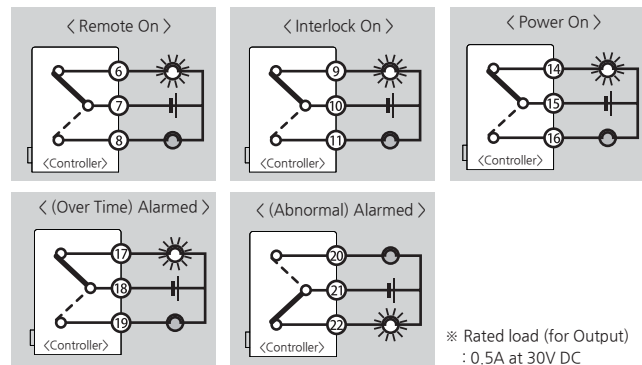
Remote Off

Under interlock ON condition, Remote is set. Remote OFF indicates that the Soft X-ray ionizer is not operating. If #2 and #3 of a D-Sub cable are connected, the remote is off.
※ The Run/Stop button is available when you don't use remote.
※ If the interlock is in off, the Soft X-ray ionizer will not operate even though the remote is on.



Output status signal

category	Remote Status Output	Interlock Status Output	Power Status Output	Over Time Alarm Status Output	Alarm(Abnormal) Status Output
D-Sub Cable No.	6-7 Close	9-10 Close	14-15 Close	17-18 Close	21-22 Close
Status	Remote On	Interlock On	Power On	(Over Time) Alarmed	(Abnormal) Alarmed
Meaning	Ion forming	Normal Operation Standby	Power applied	Allowable tube lifetime elapsed.	Soft X-ray ionizer Malfunction
Controller Indicator	Run/Stop Indicator On	Interlock Indicator On	Power Indicator On	Tube Replacement Alarm Indicator On	Malfunction Indicator On
	RUN / STOP	INTERLOCK	POWER	OVERTIME	ALARM



Error code verification

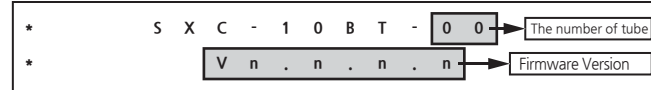
Err 2 : Internal system error of a Soft X-ray ionizer (Please contact us if the unit doesn't work properly. Within the warranty period, the expected charges will be free on your side.)
Err 4 : Ionization level of the Soft X-ray ionizer is lower than the minimum current (Replace the tube of the Soft X-ray ionizer. Contact us immediately.)

OVERTIME : Informs the arrival of the solid cycle of the consumables (Tube replacement is recommended at the next PM)

6 SXC-10BT(DC) operations

When it powers on

After displys for 2 seconds, it switch to the main screen.



The main screen

Normal condition

< Page 1 >

1 . h h h h h	2 . h h h h h
3 . h h h h h	4 . h h h h h

< Page 2 >

5 . h h h h h	6 . h h h h h
7 . h h h h h	8 . h h h h h

< Page 3 >

9 . h h h h h	A . h h h h h
B . h h h h h	C . h h h h h

- It indicates total used hours of tube.
- It shows " - - - - " on display when the tube doesn't connected.
- When the 5 tubes connected, push select button to go to < Page 2 > . (Under 4 tubes, it doesn't go to < Page 2 > .)

When the alarm occurred

ex) When the H/V alarm occurred in no.3 and no.5 tube

< Page 1 >

1 . h h h h h	2 . h h h h h
3 . A L - 0 4	4 . h h h h h

< Page 2 >

5 . A L - 0 4	6 . h h h h h
7 . h h h h h	8 . h h h h h

- It shows alarm information and tube number that alarm occurred.
- It shows alarm information and usage time of the tube that alarm occurred every 5 seconds alternately.
- Alarm information meaning
→ H/V abnormal : "AL-04"
→ Internal system error : "AL-02"

Menu

Press the enter button to switch to the menu screen.

< Page 1 >

1 . A l l	T i m e	:	[0]
2 . T B	I n f o	:	[]

< Page 2 >

3 . T B	R e s e t	:	[]
4 . C T	S e t	:	[]

1. Selecting Menu

- You can select a menu sequentially via pushing the select button.

2. Run the Menu

- You can run the menu via pushing the enter button.

1. Total Time

Indicating each tube's usage time

< Page 1 >

1 . h h h h h	2 . h h h h h
3 . h h h h h	4 . h h h h h

< Page 2 >

5 . h h h h h	6 . h h h h h
7 . h h h h h	8 . h h h h h

< Page 3 >

9 . h h h h h	A . h h h h h
B . h h h h h	C . h h h h h

- It shows each tube's usage time and alarm information.
- ※ Refer to operational method on page 04 ▶ Main screen .

2. Tube Info (Tube Information)

Indicating each tube's information : It is possible to check each tube's condition.
(Usage time, Alarm, Overtime)

T	n	A L : O F												
T	i	m	e	:	h	h	h	h	h	O	T	:	O	F

1. Tn

- You can change a tube number sequentially via pushing the select button.

2. Time

- It indicates tube's usage time.

3. Alarm condition

1) AL-04 : H/V abnormal 2) AL-02 : Internal system error

4. Overtime condition

1) On : It means that replacement cycle is come.

2) Off : It means that the tube is still available.

3. Tube Reset

1) Checking the tube reset information.

① Normal conditions

T	1	.	h	h	h	h	h	2	.	h	h	h	h	h
n	3	.	h	h	h	h	h	4	.	h	h	h	h	h

- You can run the tube reset in interlock off condition.

- It shows each tube's reset information. (Up to 8ea)→ Shows operating time before Tube Time Reset.

- It indicates informations as the number of time reset.

ex) If you run time reset 3 times, then you can see the information from no.1 to no.3.

No.4 shows current tube's usage time. From no.5, it shows "-----".

- If you run time reset over 8 times, then 9th information will be indicated in no.8.

- You can check each tube's reset information via pushing the select button sequentially.

② When the Alarm or Overtime occurred

T	1	.	h	h	h	h	h	2	.	h	h	h	h	h
n	3	.	h	h	h	h	h	4	.	A	L	-	0	4

- The tube that has alarm occurred or overtime used shows status information instead of the current time.

※ AL-04 : H/V abnormal / Over : Overtime (It doesn't indicates internal error.)

- It is possible to reset in the tube that has alarm, overtime problems.

※ Reset sign on the disply in the lower left will blink.

※ Even if you reset before the overtime, the time of use is maintained.

2) How to Tube Reset

⚠

CAUTION

* When tube operates, heat is generated. Product is hot right after operation, so be careful not to touch it. There is a risk of burn.

* A H/V connector of tube is protruded. After unscrew the bolts, pull the unit vertically. Please be careful when replacing H/V connector.

* After replacement, check if tube and Soft X-Ray Ionizer body are connected correctly. Unless they are connected properly, ground could be unstable.

* Do not unscrew any bolts other than fixing bolts.

If unscrewed, it can occur fire, electric shock, and breakages.

※ Tube reset of SXB-05NRD is avaiable only with SXB-DS. Please check the SXB-DS manual.

① Tube seperation

- Turn off the power switch at the rear of the controller, and separate the tube

② Tube combination

- When the tube replacement is complete, turn on the power switch at the rear of the controller.

※ Refer to the Soft X-ray Bar Manual for tube replacement.

③ Checking the tube reset information

T	1	.	h	h	h	h	h	2	.	h	h	h	h	h
1	3	.	h	h	h	h	h	4	.	A	L	-	0	4

- It is possible to reset in the tube that has alarm, overtime problems.

- Select the tube that need reset in Interlock off condition.

④ For tube reset execution

T	1	.	h	h	h	h	h	2	.	h	h	h	h	h
1	3	.	h	h	h	h	h	4	.	P	r	o	c	

- Execute the tube reset pushing Run/Stop button for more than 5 seconds.

- After execute tube reset, wait about 5 seconds.

⑤ - 1 When tube reset succeed

T	1	.	h	h	h	h	h	2	.	h	h	h	h	h
1	3	.	h	h	h	h	h	4	.	R	e	s	e	t

- When tube reset succeed, controller will be stop.

- Controller will be operated normally after turn off and turn on the switch at the rear of the controller sequentially.

⑤ - 2 When tube reset failed

T	1	.	h	h	h	h	h	2	.	h	h	h	h	h
1	3	.	h	h	h	h	h	4	.	E	r	r	o	r

- When tube reset failed, controller will be stop.

- Turn off and turn on the switch at the rear of the controller sequentially, and try again after checking the tube reset method.

4. Ctrl Set (Controller Setting)

RMS(Real Monitoring System) for communication Address Setting and setting of the number of connected tube.

< Page 1 >

A	d	d	r	e	s	s	:	-	-
T	u	b	e	Q	t	y	:	-	-

< Page 2 >

I	/	F	O	v	e	r	:	-	-	
I	/	F	A	I	a	r	m	:	-	-

1. Set the address value

- You can change address value sequentially via pushing the Select button. (1~16)

2. Set the number of tube

- Press Select button and you can change the number of tube in order. (1~10)

3. Overtime I/F setting

- Press Select button and it can be changed.

1) ON : Use as Overtime Interface 2) OFF : Use as Alarm Interface

4. Alarm I/F setting

1) ON : Interface alarm indicates when Soft X-Ray Ionizer stops.

2) OFF : Interface alarm does not indicate when Soft X-ray ionizer stops.

※ You can run the controller setting in Interlock off condition.

※ When you press Enter button after setting, next setting change is possible.

※ It blinks at interval on a second while you are setting on.

After all setting is done, the screen below appears and changed setting is saved at the same time.

P	l	e	a	s	e		
P	o	w	e	r	O	f	f

- It operates with changed setting figure when you turn the switch on again.

- If there is no change on setting, it does not show Power off, but moves to menu screen.

5. Interlock Off

Tube reset, Controller setting can be run in Interlock off condition. If you try to rua Tube reset, Controller setting in Interlock On condition, you can see the screen in the below on the display.

P	l	e	a	s	e						
I	n	t	e	r	l	o	c	k	O	f	f

※ How to cancel : To switch to the menu screen, wait more than 5 seconds or pressing the enter button.

6. Bar Connect

The screen in the below indicated, but that Soft X-ray Ionizer is not connected when run the tube reset.

N	O								
B	a	r	C	o	n	n	e	c	t

※ How to cancel : To switch to the menu screen, wait more than 5 seconds or pressing the enter button.

7 RS-485 Communication

1. Pin

- Pin 24 : RS-485(+)

- Pin 25 : RS-485(-)

2. Communication Spec.

- Baud : 9600

- Parity Bit : None

- Data Bit : 8

- Stop Bit : 1

8 Communication Protocol

kV	Product Type	Communications identifier by Model											
		Ionizer Model											
5	E	A	B	C	D	E	F	G	H	I	J	K	L
10		a	b	c	d	e	f	g	h	i	j	k	l

※ Different communications identifier could be chosen by the number of connected tube / tube voltage value.

1. Data Request				Communication Equipment → SXC-10BT(DC)										
Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	\$	P	M	,	R	E	Q	,	A	*	Checksum		CR	LF

Byte	Information	Byte	Comment	Remarks
0	Start Code	1		
1	Product Type	1	Photo Type Ionizer	E : SXC-10BT(DC)
2	Ionizer Model	1	5kV : A ~ L, 10kV : a ~ l	
1, 2	Broadcasting	2	ZB	Response in all products
4, 5, 6	Command	3	REQ : Request, RUN : Run, STP : Stop	Sort by the number of tube in Bar (max. up to 12)
8	Address	1	Photo : 1 ~ 16	1,2,3,4,5,6,7,8,9,A,B,C,D,E,F,G
9	End Code	1		
10, 11	Check Sum	2	Check Sum	
12, 13	Carriage Return, Line Feed	2		

1. Data Receive					Communication Equipment – SXC-10B(T/C)									
Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13
ASCII	\$	P	M	,	A	,	T/C	,	T/O	,	T/A	,	Tube	
Byte	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ASCII	Run Time(1)				T/C		T/O		T/A		Tube Run Time(2)			
Byte	28	29	30	31	32	33	34	35	36	37	38	39	40	41
ASCII				T/C		T/O		T/A		Tube Run Time(3)				
Byte	42	43	44	45	46	47	48	49	50	51	52	53	54	55
ASCII	T/C		T/O		T/A		Tube Run Time(4)						T/C	
Byte	56	57	58	59	60	61	62	63	64	65	66	67	68	69
ASCII	T/O		T/A		Tube Run Time(5)						T/C		T/O	
Byte	70	71	72	73	74	75	76	77	78	79	80	81	82	83
ASCII	T/A		Tube Run Time(6)						T/C		T/O		T/A	
Byte	84	85	86	87	88	89	90	91	92	93	94	95	96	97
ASCII	Tube Run Time(7)						I/S		R/S		P/S		A/S	
Byte	98	99	100	101	102	103								
ASCII	R/S	*	Checksum	CR	LF									

※ Standard : model with 7 tubes

Byte	Information	Byte	Comment	Remarks
0	Start Code	1		
1	Product Type	1	Photo Type Ionizer	E : SXC-10BT(DC)
2	Ionizer Model	1	5kV : A ~ L, 10kV : a ~ l	Sort by the number of tube in Bar (max. up to 12)
4	Address	1	Photo : 1 ~ 16	1,2,3,4,5,6,7,8,9,A,B,C,D,E,F,G
6	Tube1 Connect	1	1 : Normal	1 : Tube Con (Always)
8	Tube1 Over Time	1	0 : Normal, 1 : Abnormal	Abnormal when Over Time
10	Tube1 Alarm	1	0 : Normal, 1 : Tube Fail, 3 : Comm out	Abnormal except for 0
12 ~ 16	Tube1 Run Time	5	00000 ~ 99999 Hour	
18	Tube2 Connect	1	1 : Normal	1 : Tube Con (Always)
20	Tube2 Over Time	1	0 : Normal, 1 : Abnormal	Abnormal when Over Time
22	Tube2 Alarm	1	0 : Normal, 1 : Tube Fail, 3 : Comm out	Abnormal except for 0
24 ~ 28	Tube2 Run Time	5	00000 ~ 99999 Hour	
30	Tube3 Connect	1	1 : Normal	1 : Tube Con (Always)
32	Tube3 Over Time	1	0 : Normal, 1 : Abnormal	Abnormal when Over Time
34	Tube3 Alarm	1	0 : Normal, 1 : Tube Fail, 3 : Comm out	Abnormal except for 0
36 ~ 40	Tube3 Run Time	5	00000 ~ 99999 Hour	
42	Tube4 Connect	1	1 : Normal	1 : Tube Con (Always)
44	Tube4 Over Time	1	0 : Normal, 1 : Abnormal	Abnormal when Over Time
46	Tube4 Alarm	1	0 : Normal, 1 : Tube Fail, 3 : Comm out	Abnormal except for 0
48 ~ 52	Tube4 Run Time	5	00000 ~ 99999 Hour	
54	Tube5 Connect	1	1 : Normal	1 : Tube Con (Always)
56	Tube5 Over Time	1	0 : Normal, 1 : Abnormal	Abnormal when Over Time
58	Tube5 Alarm	1	0 : Normal, 1 : Tube Fail, 3 : Comm out	Abnormal except for 0
60 ~ 64	Tube5 Run Time	5	00000 ~ 99999 Hour	
66	Tube6 Connect	1	1 : Normal	1 : Tube Con (Always)
68	Tube6 Over Time	1	0 : Normal, 1 : Abnormal	Abnormal when Over Time
70	Tube6 Alarm	1	0 : Normal, 1 : Tube Fail, 3 : Comm out	Abnormal except for 0
72 ~ 76	Tube6 Run Time	5	00000 ~ 99999 Hour	
78	Tube7 Connect	1	1 : Normal	1 : Tube Con (Always)
80	Tube7 Over Time	1	0 : Normal, 1 : Abnormal	Abnormal when Over Time
82	Tube7 Alarm	1	0 : Normal, 1 : Tube Fail, 3 : Comm out	Abnormal except for 0
84 ~ 88	Tube7 Run Time	5	l00000 ~ 99999 Hour	

※ Depending on the number of connected tube, communications data byte number will be various.

90	Controller Interlock State	1	0: Interlock Off, 1: Interlock On	
92	Controller Remote State	1	0: Remote Off, 1: Remote On	
94	Controller Power State	1	0: Power Off, 1: Power On	
96	Controller Alarm State	1	0: Normal, 1: Tube Fail, 3: Comm out	Abnormal when one or more Tube Alarm happens
98	Controller Run/Stop State	1	1: Run, 0: Stop	
99	End Code	1		
100, 101	Check Sum	2	Check Sum	
102, 103	Carriage Return, Line Feed	2		

※ Standard : model with 7 tubes

2. Control [Run]					Communication Equipment → SXC-10BT(DC)									
Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	\$	P	M	,	R	U	N	,	A	*	Checksum		CR	LF

2. No Receive				Communication Equipment ← SXC-10BT(DC)								
---------------	--	--	--	--	--	--	--	--	--	--	--	--

3. Control [Stop]					Communication Equipment → SXC-10BT(DC)									
Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	\$	P	M	,	S	T	P	,	A	*	Checksum	CR	LF	

3. No Receive				Communication Equipment ← SXC-10BT(DC)								
---------------	--	--	--	--	--	--	--	--	--	--	--	--

Checksum Calculation

\$ ~ * Calculation

#include<stdio.h>

void main()

{

char packet[] = "EG,REQ,1", cksum = 0;

int i, size = 0;

while(packet[size] != '\0') size++;

for(i = 0 ; i < size ; i++)

{

if(i == 0)

cksum = packet[i];

else

cksum^= packet[i];

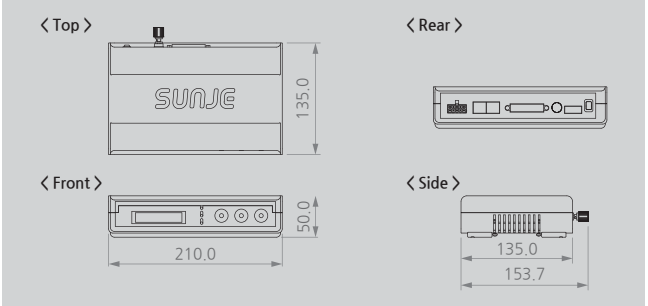
}

printf("Request : \$EG,REQ,1*% 2X",cksum); //Checksum character send by ASCII.

}

※ Checksum inspection is the result of all data from \$ to * as Exclusive-Or calculating.

9 Dimensions



10 Specification

Parameter	Description / Value
Input Power	24V DC ± 5%
Power Consumption (with Bar)	Max. 200W
Operation Circumstance	0℃ ~ +50℃(32°F ~ 122°F), 35% ~ 85% RH
Alarm Function	H/V Abnormal, Communication Error
Interface	(Run, Alarm, Power, Over Time, Remote, Interlock) Remote On/Off, Interlock On/Off, Output State
Weight	0.62kg
Warranty	1 year

※ The appearance and specification of the product may be changed without prior notice for the improvement of the product.

SUNJE Hi-Tek Co., Ltd.

www.sunstat.com

Head Office & Factory (Busan)

8 Cheonggwang-gil, Ilgwang-eup, Gijang-gun, Busan, Korea

T) +82-51-720-7500 F) +82-51-720-7501

Sunje (SHANGHAI) Trading Co.,Ltd.

205B, Building A, No.1018 Mingzhu Road, Qingpu District, Shanghai, China

T) +86-21-5433-9761 F) +86-21-5433-9762

Sales Headquarter (Osan)

3rd floor, 129-20, Gyeonggi-daero 632 beon-gil, Osan-si, Gyeonggi-do, Korea

T) +82-31-203-9034 F) +82-31-202-9034

Sunje Technology Co., Ltd.

2F, No.6, Lane.102, Sinhe Rd, Sinfong Township, Hsinchu County, Taiwan 30472

T) +886-3-568-7891 F) +886-3-568-7950

Product & Quotation Inquiries

+82-51-720-7529

Technical Support & A/S

+82-51-720-7519